

FINAL REPORT EXECUTIVE SUMMARY



SPACE GENERATION
ADVISORY COUNCIL

IN SUPPORT OF THE UNITED NATIONS
PROGRAMME ON SPACE APPLICATIONS

SPACE GENERATION CONGRESS BEIJING 2013



2013 | SPACE GENERATION ADVISORY COUNCIL





SPACE GENERATION ADVISORY COUNCIL
In Support of the United Nations Programme on Space Applications
C/o European Space Policy Institute (ESPI)

Schwarzenbergplatz 6
Vienna A-1030
AUSTRIA

Email: info@spacegeneration.org
Website: www.spacegeneration.org
Phone: +41 1 718 11 18 30
Fax: +43 1 718 11 18 99

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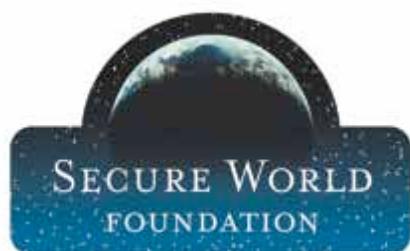
Sponsors and Partners

The 2013 Space Generation Congress (SGC) would not have been possible without the generous support from our sponsors. This year sponsors provided subject matter experts, speakers, reports, data and other means of support to the intellectual content of the Space Generation Congress. The Space Generation Advisory Council (SGAC) would like to thank them for their contributions to one of the most successful Space Generation Congresses to date.

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Letter from SGC Chairs

We are very happy that Space Generation Congress 2013 was a resounding success, despite all associated challenges with putting together an event of this magnitude. This year's congress posed a special challenge, as our delegates from a variety of international backgrounds had to strongly rely on a few native speakers to bridge the cultural gap and innovate ways to access the internet. Yet we are pleased to see that the 12th Space Generation Congress was as exciting and productive event that, yet again, set new standards for the years to come. During the intense workshop session our participants spent time developing their ideas and work on recommendations. Space agency leaders and industry professionals shared their ideas and offered their opinions during plenary sessions, allowing our participants to socialize and interact with them directly. The optional *Cultural Night* has been celebrated for the second year: it highlighted the spirit of SGAC - bridging boundaries with ease, respect and a lot of fun. This year again, our congress photographers busily captured the soul of the SGC and provided the PR & Communications team with fantastic material and videos with an effort to share our message with all SGAC members. The second edition of the SGC Fireside chat afforded our delegates with the unique opportunity to discuss matters with astronauts, as well as learn from their experiences. The Congress culminated in interesting insights from all participants which we intend to disseminate through reports.

The Congress was fantastic and a great cultural and personal experience for our team. It is always the highlight of the year to catch up with colleagues and friends, in addition to making so many new ones while exploring the wonders of another country! We are also looking forward to the SGC 2013 Report and their short videos. The results and ideas of our participants will be processed and presented to decision makers in the following year.

The next year will be busy again with the third edition of the Space Generation Fusion Forum and Space Generation Congress 2014: keep your eyes open for details!

In the spirit of Ad Astra per Aspera: thank you for being a fantastic team, and see you next year!

CJ Nwosa

SGAC Chair

Chris Vasko

SGAC Co-Chair



Letter from SGC Congress Manager

The Space Generation Congress 2013 has been an absolute success. Last year's Congress in Naples, Italy, set the bar very high and beating last year's records has been a difficult feat, especially with China being far from the SGAC Headquarters in Vienna.

This was my second year as manager of the Congress, and despite the initial challenges of cultural differences and distance, the 12th edition of the Space Generation Congress has exceed all expectations by far. It has been a pleasure to work with the SGC Organising team this year; a team comprising 22 individuals from 15 countries, who worked even during their free time to offer the best to our delegates. We worked hard since the very beginning to offer delegates one of the best congresses SGAC has ever packaged. Now we can proudly say: mission accomplished!

Space Generation Congress 2013 welcomed the largest Asia Pacific delegation in the event's history; with more than 36 delegates hailing from the region. The Congress recorded participation from the highest number of countries ever and hosted exceptional working group presentations. SGAC granted 25 scholarships and awards to enable delegates' participation at this year's Congress and, following last time success, recipients were all awarded full funding. SGC 2013 also held the second SGC International Night, a spectacular event that allowed delegates to share the importance of collaboration between countries. Further achievements included the largest Gala Dinner ever organised by SGAC, as well as very successful agreements with new partners.

I would like to personally thank the Organising Team for their hard work and dedication in making the 12th Annual Space Generation Congress a truly historic event. I look forward to seeing you back at next year's event in Toronto, Canada for what will be another remarkable Space Generation Congress!

Andrea Jaime Albalat

Executive Director and Congress Manager

SGC 2013 Conference Overview

Delegates at the 12th Annual Space Generation Congress in Beijing, China



The Space Generation Congress (SGC) is the annual meeting of the Space Generation Advisory Council in Support of the United Nations Programme on Space Applications. Participants are top university students and young professionals with a passion for space. SGAC aims to hone and promote the voice of the next generation of space sector leaders on topics relating to international space development. The three days of SGC 2013 brought both young and experienced students as well as professionals in the space sector together. They travelled from 38 countries for an inspiring and resourceful engagement with their peers. This year, the event was hosted at the Beihang University, in Beijing, China from 19 to 21 September. The congress took place days prior to the 64th International Astronautical Congress (IAC). The Congress was attended by 116 delegates. This year's registration attracted applicants from over 58 countries, which demonstrates SGAC's ever-growing network of international members, as well as the high calibre of the organisation and its events.

Delegates were exposed to perspectives on space issues from the world's leading space organisations, including: the International Astronautical Federation (IAF), National Aeronautics and Space Administration (NASA), and the United Nations Committee on the Peaceful Uses of Outer Space (UN COPUOS).

Similarly, leaders from these space organisations had the opportunity to learn of fresh, innovative and bold perspectives from the incoming space generation on the five main themes of SGC 2013: Industry, Agency, Society, Exploration and Earth Observation. SGC 2013 was supported by several sponsors and organised by a committee of volunteers from across the globe. The 2013 Space Generation Congress would not have been possible without our supporters and dedicated volunteers, and SGAC would like to express its gratitude and appreciation.

Charles Bolden	NASA Administrator
Carissa Christensen	Managing Partner, The Tauri Group
Markus Enenkel	FFG/Bmvit Space Applications Competition Winner
Kiyoshi Higuchi	President of the International Astronautical Federation (IAF)
Yasushi Horikawa	Chairperson of UN COPUOS and Technical Counsellor at JAXA
Michael K. Simpson	Executive Director, Secure World Foundation
John Karas	Vice President and General Manager of Human Spaceflight at Lockheed Martin
Kathy Laurini	Senior Advisor at NASA
Martin Leitgab	International Space Solar Power Competition Winner
Mazlan Othman	Director of United Nations Office for Outer Space Affairs (UNOOSA)
Elliot Pulham	CEO Space Foundation
Dorin Prunariu	President of Association of Space Explorers (ASE)
Massimo Vetrivano	2013 Move and Asteroid OHB-SGAC Competition Winner
Jingnong Weng	Vice Dean, International School Beihang University
Confirmed but unable to attend:	
Junichiro Kawaguchi	Hayabusa Project Manager, JAXA
Sandy Magnus	Executive Director of the AIAA and former NASA Astronaut

Day One

- Executive Director, Andrea Jaime, and SGAC Co-Chair, Chris Vasko, welcomed delegates together and expressed their excitement and optimism for this year's event.
- Dean of Beihang University, Dr Chen warmly welcomed all delegates to the Beihang University Campus, and encouraged them to enjoy it as much as they could in the following days, especially during the Moon Cake Festival.
- Dr. Jingnong Weng, Vice Dean, International School of Beihang University, introduced this unique venue with a great presentation, highlighting academic programmes as well as social programmes to the participants, with an emphasis on the International School.
- The members of the SGC Project Team, Jeroen van den Eynde, Natassa Antoniou, Sandra Gonzalez and Yusuke Muraki, gave a presentation to introduce the five project Groups to all the delegates.
- Delegates dispersed into the coffee break for some networking and later went to their respective working groups to discuss the specific topics assigned for their project.
- After lunch, the Space is Business 2013 Competition Winner, Lluç Palerm, presented his great idea on a specific business model.
- Executive Director of Secure World Foundation and Spotlight Speaker for the Society Working Group, Michael Simpson, addressed delegates about the importance of communicating properly with the society in the case of a NEO Impact.
- SGAC Project Co-Coordinator Alanna Krolkowski and members of other Project Groups introduced the currently seven active SGAC Projects, and provided brief overviews of their activities.
- SGC 2013 delegates participated in the Opening Dinner, where they were able to enjoy Beijing's most known delicacy, the famous Beijing Duck, as part of a 12 course meal sponsored by Astrium

SGC Delegates



Day Two

- SGAC Chair, CJ Nwosa, remotely addressed the attendees of the Congress and kicked off the second day.
- One of the winners of the second edition of the International Space Solar Power Competition, Martin Leitgab, presented his winning idea remotely via an online interface. SGAC is proud to have successfully have hosted a virtual session in China such as this for the first time.
- The morning continued with an insightful discussion led by this year's Industry spotlight speaker, Carissa Christensen. Ms Christensen is the founder and Managing Partner of The Tauri Group, an analytic consulting firm based in Virginia, USA. Drawing from her large expertise on commercial space, she provided a brief analysis of space systems and industry economics featured in nations across the globe.
- In the afternoon session, delegates were addressed by Dr. Yasushi Horikawa, UNCOPIOS Chairman and this year's spotlight speaker for the Earth Observation Working Group. He spoke of the importance of the Earth Observation applications, and how it has become one of the key topics for all nations at the UN.
- Senior advisor within NASA HQ's Human Exploration and Operations Missions Directorate and Spotlight speaker for this year's agency group, Kathy Laurini, spoke about the importance of education and outreach in space, especially in exploration programmes
- SGAC Co-Chair, Chris Vasko, introduced delegates to the International Astronautical Congress with his presentation, *Getting to Know the IAC*, offering insight, and handy tips to prepare delegates for the momentous annual Congress, in the days following the SGC.
- In the evening, our delegates participated in the second edition of the *SGC International Night*, hosted at the XinChen Theatre of Beihang University complete with stage and sound system. Representatives were invited to introduce aspects of their respective countries through presentations, cuisine, songs, dances or performances. Delegates were engaged in many interactive and exciting activities, making the night a huge success.

Mazlan Othman, Director of UNOOSA during her speech at SGC



SGC International Night



Day Three

- Winner of the OHB *Move an Asteroid* Competition, Massimo Vetrivano, presented his idea for asteroid deflection.
- Representatives from *Yuri's Night* connected for the second virtual session to provide SGC Delegates with an informative session, encouraging everybody to organise a *Yuri's Night* at their respective countries. *Yuri's Night* is a project resulting from the SGAC.
- *World Space Week Association (WSWA)* Executive Director, Remco Timmermans, presented the WSWA to the delegates and launched the biggest event ever done to celebrate the World Space Week. For this, SGC connected *live* with the Mission Support Center of this year's theme "Exploring Mars, Discovering Earth" in Innsbruck, Austria. The Support Center was hosted and organised by the Austrian Space Forum, also a Partner of SGAC. After this exciting launch, SGAC Co-Chair Chris Vasko signed a Memorandum of Understanding with WSWA, officially establishing the link between both organisations.
- President of the *International Astronautical Federation (IAF)*, Mr. Higuchi, was next to address the Congress, emphasising the importance of international collaboration and motivating the delegates as future space leaders.
- Dimytro Faizullin, NPoC of Ukraine, and Chris Vasko, SGAC Co-Chair, signed a Memorandum of Understanding between SGAC and the *Council of Ukrainian Youth Space Industry Workers*, bringing great benefits to both organisations.
- Elliot Pulham, CEO of the *Space Foundation*, addressed the SGC delegates next. He gave an overview of the organisation, as well as emphasized the importance of space education as a task to be done by all of us. He encouraged all delegates to attend this coming year's *Space Generation Fusion Forum* and *National Space Symposium*.
- The Director of UNOOSA Mazlan Othman, spoke to the SGC Delegates for the first time in SGC history. Not only did she introduce the UNOOSA office, but also detailed the importance of the UNCOPIUS and having the input of the new generation to the shaping of the space sector.
- President of *Association of Space Explorers (ASE)* and former Romanian astronaut, Dr. Dorin Prunariu, had a chat with Chris Vasko, where he shared his flight experience with the delegates, and answered many questions from them.
- Throughout the Congress, delegates were divided into five Working Groups tasked to focus on a specific area of interest prominent in today's space industry. On the final day, SGC 2013 delegates presented their novel perspectives addressing space issues concerning the themes: Industry, Society, Agency, Earth Observation and Exploration. The results, conclusions and recommendations that were presented to the audience were devised and discussed throughout the Congress. Summaries of SGC 2013 Working Groups' findings can be found under "Congress Themes and Recommendations".
- The SGC 2013 Closing Gala Dinner was attended by SGC 2013 delegates and prominent international leaders of the space sector. The Gala Dinner was the most successfully attended Closing dinner in history: the 210 guests enjoyed a Chinese meal of several courses at the beautiful and spectacular *The Mansion* Restaurant of Beijing. The dinner provided delegates with a valuable networking opportunity, as they were seated with various representatives of a number of international space organisations. Guests were addressed by General Manager for Human Space Flight at *Lockheed Martin*, John Karas, who portrayed a positive outlook for the space sector. The highlight of the night was NASA Administrator Charles Bolden, who gave the Keynote address of the gala dinner. Administrator Bolden outlined the importance of international collaboration and what role it may play in the sector, as well as the importance of the next generation of space advocates within the space sector, especially for the field of Exploration.

- During the Closing Gala Dinner, SGAC's Co-Chair, Chris Vasko, and SGAC Executive Director, Andrea Jaime, and various supporters presented certificates to the 26 delegates who were granted scholarships or awards.
- The Congress reached a close as SGAC Executive Director, Andrea Jaime, thanked SGAC's sponsors, partners, and supporters, and praised the great work dedicated by the SGC 2013 organising team.

Kiyoshi Higuchi, President of the IAF, during his speech, next to Andrea Jaime, SGAC Executive Director



FireSide Chat with Chris Vasko, SGAC Co-Chair and Dr. Prunariu, President of the Association of Space Explorers and former astronaut



Charles Bolden, NASA Administrator, speaking at the SGC Closing Gala Dinner



Day 4 (Independent Event):

The Global Navigation Space Systems and Earth Observation for Disaster Management Workshop

The Space Generation Advisory Council's Youth for Global Navigation Satellite Systems (YGNSS) and the Space Technologies for Disaster Management (STDM) Project Group organised the first Workshop on "*The Role of GNSS and Earth Observation in Disaster Management*" - an event that offered about 25 students and young professionals the opportunity to meet and exchange views with leaders of the space sector from government, industry, and academia on how GNSS (Global Navigation Satellite Systems) and Remote Sensing technologies are used in disaster management.

The workshop was held on Sunday 22nd September after the 12th Space Generation Congress (19-21 September) and prior to the 64th International Astronautical Congress (IAC) (23-27 September). It gathered young space professionals and students from various backgrounds to explore this topic, receive interactive hands-on experience using key tools, and network with other professionals, as well as with GNSS experts.

This opportunity included background presentations, panel discussions, and hands-on training provided by high-level experts from local, international, and multilateral organisations.

The workshop commenced with Scott Pace of George Washington University, who highlighted the challenges of effective disaster response and the necessity of coordination and international cooperation among countries engaging in disaster management, requiring not only technical skills, but interagency collaboration as well. Pace noted "one of the reasons why disaster management and the role of GNSS is so important is because it is a common language across many different countries".

Olojo Olabamiji (Nigeria) of Cranfield University presented how GNSS and satellite Earth Observations (EO) are used in disaster management, what the problems with the data sharing are, and how there is "an issue of trust between the people and government". During the panel discussion, there were three key experts who examined public and private cooperation on integrating disaster management tools on domestic, international and multilateral levels.

The workshop delegates during one of the presentations



The workshop delegates during the hands on session



Shirish Ravan (India) from the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) began by giving a brief history of disaster management. He then highlighted that people should prepare well before the disaster occurs. He further stated that "We should be prepared to respond to disasters as a national priority."

Enrique Pacheco (Mexico) from the Mexican Space Agency shared with the delegates how the agency desires to be further involved in developing new space capabilities. In particular, it is currently focusing on the development of small satellites, where there is a great challenge, as well as taking into consideration the disaster monitoring cycle during the development process. He explained that agencies will build strategies and support, firstly, the management of the wide range of scenarios that disasters present.

Falin Wu (China) of Beihang University was the Chinese expert speaker for the workshop and explained briefly how China uses Navigation Systems. In particular, he explained the technical aspects and how GNSS technology can be used for studying climate and navigation.

Finally, there was a training session that introduced attendees to ESRI's *ArcGIS* platform, led by Katrina Laygo (USA) of George Washington University. She provided a tutorial presentation and taught the delegates how to integrate Geographic Information Systems (GIS) mapping into disaster management practices. Using example scenarios, she provided an analytical hands-on experience in disaster management mapping for the delegates. With participants coming from different backgrounds, many felt this was a great introduction to the topic.

Overall, the event was a great success, with many of the speakers suggesting a follow-up activity, and perhaps further collaboration in the future. Special thanks goes out to *Lockheed Martin* for their sponsorship support, Natassa Antoniou (Greece) for moderating, and Sandra Cabrera (Mexico) and Stephanie Wan (USA) for organising the event.

Group Picture of the Workshop in Beihang University



congress statistics

SGAC closed registrations for the Space Generation Congress on 1st September, with more than 250 applications from 58 different countries.

After a diligent selection process, a total of 116 delegates participated in SGC 2013. Of those 116, 25 participants from 13 countries received scholarships with assistance from SGAC and its partners to attend SGC 2013 in Naples. There was a relatively even distribution of genders amongst final delegates, with 31% women and 69% men, an achievement that is uncommon for events in the space sector. Delegates came from vast and varying backgrounds, with 22% undergraduate students, 21% masters students, 16% PhD students, 41% young professionals. SGAC believes that these statistics truly demonstrate SGAC's international influence, and that it continues to grow. This development gives SGAC the momentum to establish a distinct and highly representative network of young space professionals and university students.

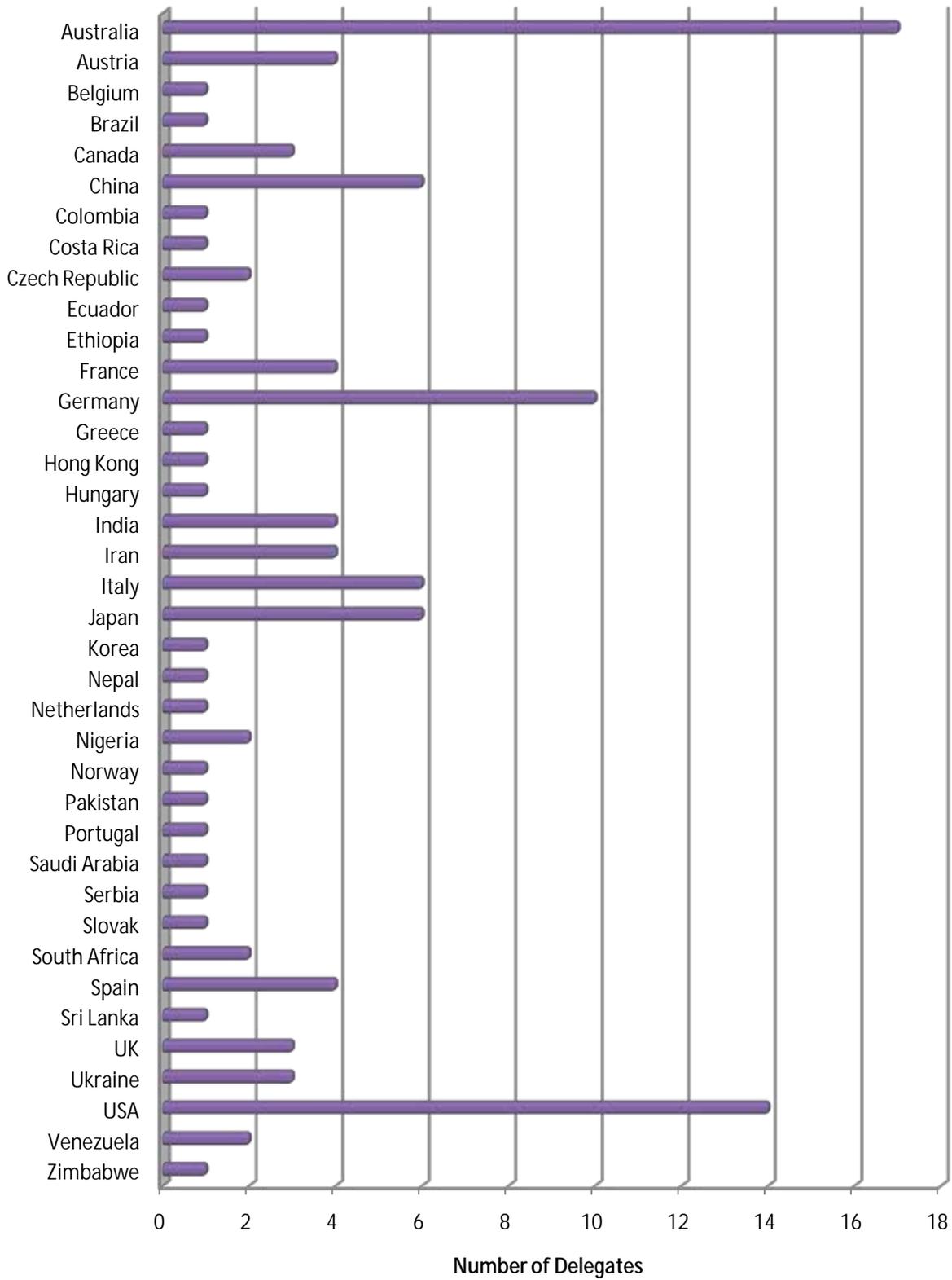
SGAC is also pleased to have welcomed a diverse representation of delegates from an array of countries and regions. SGC 2013 attendees came from more than 38 countries across six continents, setting another Space Generation Congress record. This internationalism is a major contributor to the development of a truly international voice of the space generation that SGAC strives to epitomise.

Networking opportunities during the coffee breaks



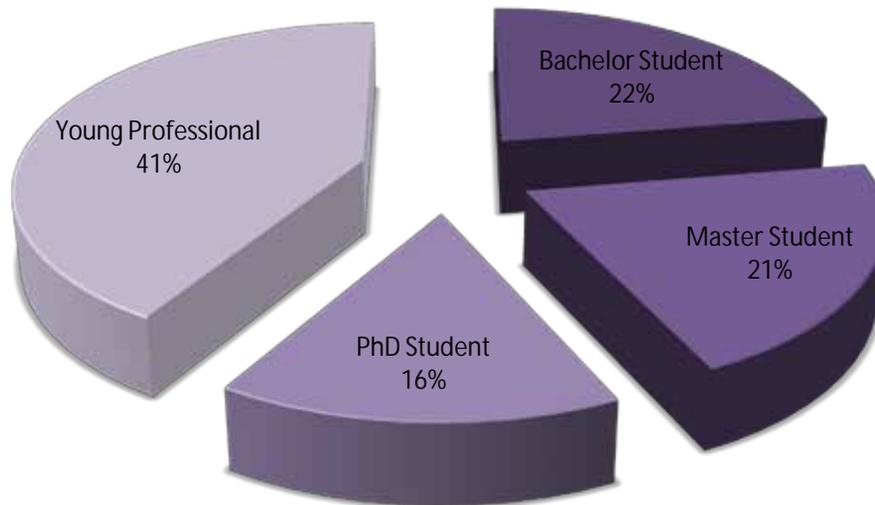
Representatives from 38 countries participated in SGC 2013. The highest percentage of delegates came from Australia, followed by the United States of America and Germany.

SGC Delegate Citizenship



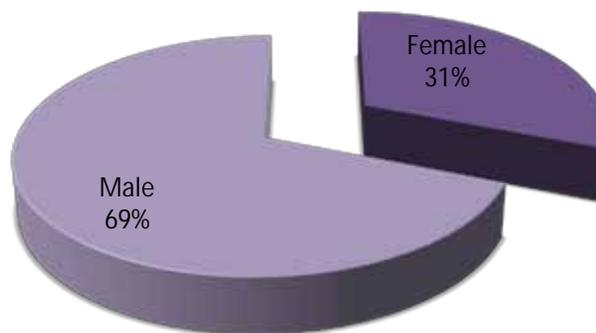
Whilst the majority of SGC delegates were students across the undergraduate, masters and PhD levels, close to 41% were young professionals working within industry, in a postdoctoral position or working in space agencies.

Professional Status of SGC 2013 Delegates



SGAC is proud to have had relatively even gender distribution amongst the SGAC Team. However, the pool of delegates at SGC 2013, represented a bit less balanced distribution than in the past with a 31% female representation. SGAC hopes to increase the participation of female in future events.

Gender of SGC 2013 Delegates



This year, SGAC provided four (4) Young Leadership Awards to the organisation's outstanding members to attend SGC 2013, as well as 21 scholarships to competition winners. 13 countries from 6 continents were represented. As one of SGAC's goals is to facilitate opportunities for young members of the international space community to join together to discuss space issues, the 25 scholarships are seen as a key indicator of the success of SGC 2013. In addition to those, SGAC also offered a special discount to Beihang University Students as well as partial scholarship to 5 delegates to attend the GNSS and EO for Disaster Management Workshop.

Distribution of SGC 2013 Scholarships



Last Name	First Name	Grant	Country (main)
Bowen-Rotsaert	Alexander	AYAA Australian Futures Award	Australia
Gorur	Eren	AYAA Australian Futures Award	Australia
Rea	Imogen	AYAA Australian Futures Award	Australia
Furness	John	AYAA Australian Futures Award	Australia
Saini	Mandeep	AYAA Australian Futures Award	Australia
Hacker	Jacob	AYAA Australian Futures Award	Australia
Enenkel	Markus	FFG/Bvmit Space Applications Scholarship	Austria
Zu	Zihua	Young Leadership Award	China
Sandoval	Magaly	SSPI Satellite Futures Scholarship	Costa Rica
Tesfaye	Beza	Young Leadership Award	Ethiopia

Last Name	First Name	Grant	Country (main)
Küpers	Lisa	DLR Standout Student Scholarship	Germany
Kraetzig	Benjamin	DLR Standout Student Scholarship	Germany
Prokein	Daniel	DLR Standout Student Scholarship	Germany
Hornig	Andreas	SSPI Satellite Futures Scholarship	Germany
Meskoob	Behnoosh	SGAC Young Leadership Award	Iran, Islamic Republic of
Cowley	Aidan	Space Solar Power Scholarship	Ireland
Vetrisano	Massimo	SGAC-OHB Move an Asteroid Scholarship	Italy
Kido	Ayano	Japanese Scholarship	Japan
Sada	Kenta	Japanese Scholarship	Japan
Palerm	Lluc	SGAC \$pace is Business! Scholarship	Spain
Gonzalez Diaz	Sandra	SGAC Young Leadership Award	Spain
Leitgab	Martin	Space Solar Power Scholarship	USA
Wan	Stephanie	NASA ScaN Support	USA
Tchorowski	Nicole	SGAC-ScaN Summer Intern Programme Scholarship	USA
Ana	Perez	GNSS and EO for Disaster Management Workshop Scholarship	Venezuela

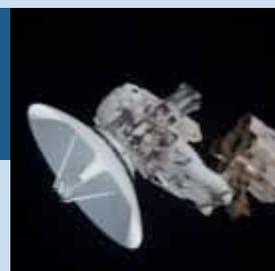
	WED, 18	THU, 19	FRI, 20	SAT, 21	SUN, 22
08:30		Late Registration			
09:00		SGC 2013 Welcome	SSP Competition	OHB MAA Competition	
		Beihang University Welcome & Introduction	Spotlight Industry Speaker – Ms Christensen	Space Networks Reps	
10:00		SGC Working Groups Introduction	Working Group Time	IAF President – Mr Higuchi	
		Coffee Break	SGAC Projects Coffee Break	WSW MoU Coffee Break	
11:00		Working Group Time	Working Group Time	Eliot Pulham – Space Foundation	GNSS Disaster Management Workshop (Separate Event)
				Group Picture	
12:00				Working Group Time	
13:00		Lunch	Lunch	Lunch	
		Space is Business	Austrian Competition	Working Group Time	
14:00		Spotlight Society Speaker – Dr Simpson	Working Group Time		
		Working Group Time		Fireside Chat with Space Explorers	
15:00					Coffee Break
16:00		Coffee Break	Coffee Break	Working Group Presentations	
		Working Group Time	Spotlight Earth Observation Speaker – Dr Horikawa		
17:00	Delegate Arrivals & Registration			Spotlight Agency Speaker – Mrs Laurini	Free Time
			Spotlight Exploration Speaker – Prof Kawaguchi		
18:00		SGAC Projects Info Session	Getting to know the IAC		
19:00		Free Time	Free Time		
20:00	Optional Dinner – Hot Pot	Opening Dinner – Beijing Duck	Free Time	Closing Gala Dinner – Grand Mansion Restaurant – Featured Speaker: Charles Bolden	
21:00					International Night – Beihang University

Industry – Space Industry in the Era of Globalisation



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Agency – Space Communications in our Daily Life



17

Society – Near Earth Objects, Impact in Society



18

Exploration – Exploitation of Space Resources: Legal & Political Implications



20

Earth Observation – Earth Observation for Sustainable Development



21

At the core of SGC 2013 were the working groups, where delegates discussed their views on the development of space and prepared a set of recommendations to be published internationally by SGAC. Each working group will eventually produce a report on their discussions and recommendations, which will be shared with the United Nations as well as SGAC sponsors, members and alumni from around the world. SGAC would like to thank the key session supporters, NASA SCan, Secure World Foundation and SGAC's Anonymous Donor, for making these SGC working groups possible.

Industry – Space Industry in the Era of Globalisation

Supporter: N/A

Subject Matter Experts: Alanna Krolikowski (Canada) and Paul Gauthrie (USA)

Moderator: Sandra Gonzalez Diaz (Spain)

Industry has to quickly adapt to the current economic situation of financial uncertainty. Investors are setting lower values on high-risk, long-term projects. This is creating a situation of capital scarcity in the space industry that, together with the lower volume of projects in the backlogs of contractors, is hindering the future competitiveness of the industry. Competition and smaller project's budgets put big space equipment providers under pressure, and trigger the appearance of more small/medium size companies, especially in developing countries.

Industry plays an important role in a globalised world, acting as mediator to bridge the gap between space fairing nations and developing countries. The potential of these relationships can be relevant for strengthening ties between countries on political or economic levels.

During the SGC industry group sessions the previous topics have been discussed and have lead to the following recommendations:

- Customer Focus: At early stages of development, commit resources to generate reliable insight into customer demand and use cases, as well as involve users in product development.
- Entrepreneurship: Explore and integrate, where appropriate, best practices from adjacent high-tech industries to foster innovation.
- Internationalization and Industrial Partnership: Invest in international public-private partnerships to efficiently determine interfaces, form standards, and solve other technical issues that individual governments and firms cannot address alone. In addition, take full advantage of new low-cost, small-scale technologies to build international partnerships.
- Knowledge Management: Adapt knowledge management models to actual employment patterns by exploring new software tools for effective knowledge management; foster a closer work environment between professionals at all levels of experience; and prioritize the development and long-term training of young professionals in project management strategy.

Launch of Shenzhou 10



Delegates working during the Working Group Sessions



Agency – Space Communications in our Daily Life

Supporter: NASA SCA_N

Subject Matter Expert: Stephanie Wan (USA)

Moderator: Katrina Laygo (USA)

The Agency Working Group discussed the benefits of space communications in daily life and strategies for conducting outreach to increase awareness of such benefits. Space communication plays an important role in society and in our technologized world. In light of this, it is remarkable how little the public is aware of space communication and its benefits. The connection between space applications and in particular, space communications and services are unknown to a large part of the population. Therefore, efforts to raise awareness should reach people from a variety of backgrounds, as well as different nationalities and age groups.

ISS Spacewalk. Credit: NASA



Note: the complete Working Groups reports will be published by the end of the year 2013, in the Space Generation Congress 2013 Final Report.

The group examined the stakeholders in space communications and developed a detailed outreach strategy. This included a definition of the content to be communicated to stakeholders, as well as the media tools to be used. They concluded that an educational, dynamic, and integrated video, image, and game application campaign would be the most effective means of targeting and engaging stakeholders.

The group recommended that the most successful means of integrating this video, image and game campaign would be by utilizing a neutral coordinating organization, such as SGAC, when facilitating stakeholder outreach in the working group members' respective countries. The group recommended collaboration with existing outreach campaigns, such as NASA's International Space Apps Challenge and UK Catapult "Future Cities" as strategies for funding. They recommended that the outreach strategy be divided into several short, medium, and long term efforts, as this would provide an interesting chance of return on investment if stakeholders, such as satellite communications providers, were to consider participating in the short term efforts discussed in the group, thus establishing a basis for medium and long term outreach phases.

Society – Near Earth Objects, Impact in Society

Supporters: Secure World Foundation

Subject Matter Expert: Ray A. Williamson (USA)

Moderator: Bruno Sarli (Brazil), Zhuyan Lu (China)

The Society Working Group discussed how nations and international organisations can efficiently inform the population in case of a Near Earth Object (NEO) threat. In addition, it was also discussed how current media can help (or not) in this endeavour. The working group based its discussion on the report submitted by the Action Team 14 (AT-14) at the UNCOPUOS and on Secure World Foundation's paper titled "Crafting an effective communications plan for an international response to a threatening Near Earth Object".

To successfully and efficiently deliver information about NEO threats, the working group addressed four main issues:

- How to define an effective communication plan to prepare governments and the public to effectively respond to the potentially hazardous NEO.
- How to implement a coordinated programme of education targeting the public, policy makers, students, and media.
- How to define criteria to identify communicators to be used to deliver NEO threat information effectively and avoiding misinformation.
- How to access NEO Research data and real-time information

Chelyabinsk Meteor (15th February 2013)



The working group recommended not creating new organisations to deal with the communication process, but to work instead with existing ones. The group acknowledged the work carried out by AT-14 and endorsed their recommendations to support the development of the International Asteroid Warning Network (IAWN) and Space Mission Planning Advisory Group (SMPAG).

The group presented the following recommendations:

- Effective communication plan should foresee long, medium and short-term actions to cope with the NEO threat at different stages. Long-term action will target the general public to raise awareness and foster scientific education. At this stage, the plan should be implemented by local governments in accordance to the guidelines provided by IAWN. SGAC can greatly contribute at this stage continuing its outreach activities also translating the material in different languages in order to reach a wider audience. Medium-term action will require decision-makers to develop contingency plans in the remote case of a highly probable impact. Short-term actions will directly target general public and governments using the preparation and training learned with medium/long-term communication strategies to mitigate the consequences of threats. The group also recommended implementing new tools to directly connect the NEO threat to a procedure to be executed on ground in order to mitigate the risk.
- An effective educational plan should consist of implementing a multilevel strategy addressing different ways of providing the population with correct and factual information. The plan should implement a “media training” with the support of universities, agencies and institutes, to produce NEO threats related TV-series, movies, advertisements and other similar media, with the guarantee of factual correctness of the material presented. Accredited organisations and international groups would aid policymakers in responding to a NEO threat and its possible consequences. In addition, schools, museums, planetariums and virtual forums should play an important role in the education of students and general public. Where the general public could not access this kind of activities, the group recommended getting NGOs involved in contributing to the process through community gatherings and other tools already in place for other kind of emergencies.
- Taking into account the differences between nations and their available infrastructure, every nation should identify possible communicators and implement impact risk management within its own emergency service unit(s). Emergency responders should be educated on the specific threats of asteroid impacts. This highlights the importance of an Impact Disaster Planning Advisory Group (IDPAG) functioning under an SMPAG to coordinate international activities and to support national efforts. In the initial phases, national emergency service units should contact and receive information from a UN IDPAG. In the event of a short-term threat, emergency service units should start an awareness campaign to inform the public of the threat and about possible mitigation measures. As a long-term response, IAWN should act as a central body for any information and international communications between countries.

Members of the Society Working Group during the working sessions



Exploration – Exploitation of Space Resources: Legal and Political Implications

Supporter: N/A

Subject Matter Expert: Matt Maniscalco (USA)

Moderator: Jeroen Van den Eynde (Belgium)

The Exploration Working Group examined the emerging space resources industry and the political, legal and social challenges, which it faces. The group firstly discussed the need for and application of such an industry, agreeing that there are numerous benefits to humankind. It is evident that companies such as Deep Space Industries and Planetary Resources are developing technologies to mine celestial bodies, however provisions of the current international space law treaties, such as the Outer Space Treaty, Liability Convention and Moon treaty, leave uncertainties about private ownership of what is mined, potentially preventing the progression and development of the industry.

The group also discussed what is socially acceptable in terms of space mining, specifically with consideration to protecting the environment and unique heritage, while enhancing scientific research.

The group made the following recommendations based upon their conclusions:

- Due to ambiguities in the property rights of celestial bodies, we require an interpretation of terms in the Outer Space Treaty to permit the utilisation of space resources.
- An impartial, international body should be formed, tasked with addressing scientific, cultural and environmental concerns involved with space mining. Such a body would implement a regulatory framework to protect the common heritage of humankind.
- Liability for space operations currently falls to the launching state. It was deemed that this places an excessive burden on these states limiting the growth of the industry. As a result it is recommended that a UNGA resolution be amended which highlights the importance of the creation of national space laws to regulate the allocation of risks between the States and the

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Asteroid Eros. Credit: NASA



private entities. Meanwhile, states should acknowledge limitations in the Liability Convention and solve both on a national and international level.

Space mining has the opportunity to greatly further human progress through economic stimulation and technological and scientific advancement. The group believes that through appropriate regulation and national and international input; the benefits of space mining can be experienced while avoiding the possible detriments that could entail.

Members of the Exploration Working Group during the Working Group Sessions



Earth Observation – Earth Observation for Sustainable Development

Supporter: SGAC’s Anonymous Supporter

Subject Matter Expert: Yusuke Muraki (Japan)

Moderator: Jacob Sutherlun (USA)

The Earth Observation working group discussed the challenges and possible solutions of earth observation for sustainable development in developing countries. In this context, the term “development” is not specifically focusing on the technology development but includes economic growth and poverty reduction. The main challenges identified by the working group are: data access and Utilisation, lack of awareness, lack of technical capacity, lack of coordination and political will. These are few among many challenges that developing

Earth from GEO. Credit: NOAA



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countries are facing at present.

The group discussed the use of Earth Observation applications for sustainable development. The major Earth Observation application areas where developing countries can benefit are: disaster relief, agriculture, medicine, weather forecasting, and communication among many others such as oil theft and bunkering, piracy and illegal fishing and maritime security.

The working group also pointed out the following recommendations and conclusions:

- **Data Access and Utilization:** Promotion of a data-sharing framework; expand current framework for disaster emergency response to other phases; develop a similar international framework for other areas; create a data-sharing mechanism based on contribution from member countries including developing countries; encourage private sector involvement in international initiatives and fund a study for the benefits of sharing data through research.
- **Policy:** More investment on study and sharing of best practices on the use of Earth Observation data for sustainable development in developing countries also more investment on development of cost/benefit analysis that supports policy maker's ability to understand benefits of Earth Observation.
- **Awareness:** Increase users' awareness on datasets and their benefits; increase space community's awareness on user needs.
- **Technical capacity:** Form templates for STEM education; educate the educators; Brain Drain: Share job creation techniques and promote technical exchanges where the trained skills are used domestically?
- **Duplicative Efforts:** Domestically - clarify roles and responsibilities amongst agencies in an individual country; internationally – identify and share international efforts through workshops, web portals, etc.

Members of the Industry working group during their discussions



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SGC 2013 Organising Team

Name	Citizenship	Role
Chijioke (CJ) Nwosa	Nigeria	Chair
Chris Vasko	Austria/Hungary	Co-Chair
Andrea Jaime	Spain	Executive Director and Congress Manager
Felipe Arevalo Botero	Colombia	SGAC Intern to Vienna Office
Beza Tesfaye	Ethiopia	Logistics Co-Coordinator
Zihua Zhu	China	Logistics Co-Coordinator
Natassa Antoniou	Greece	Project Co-Coordinator
Sandra Gonzalez Diaz	Spain	Project Co-Coordinator
Jeroen Van den Eynde	Belgium	Project Co-Coordinator
Jacob Hacker	Australia	Delegate Co-Coordinator
Behnoosh Meskoob	Iran	Delegate Co-Coordinator
Edu F. Aymerich	Spain	Communications Co-Coordinator
Leila Ghasemzadeh	Iran	Communications Co-Coordinator
Zhuoyan Lu	China	Local Organising Team
Cynthia Chen	Australia	Local Organising Team
Jack Yeh	New Zealand	Local Organising Team
Saqib Mehmood	Pakistan	Local Organising Team
Yuchen Wei	China	Local Organising Team
Stephanie Wan	USA	Workshop Manager
Sandra Cabrera	Mexico	Workshop Co-Manager
Yusuke Muraki	Japan	Asia Pacific RC & Project Team Support
Suresh Bhattarai	Nepal	Asia Pacific RC
Reinhard Tlustos, Klaus Kornfeld and Luís Ferreira	Austria, Austria and Portugal	Photography Coverage



SPACE GENERATION
ADVISORY COUNCIL

Schwarzenbergplatz 6
Vienna A-1030
AUSTRIA
info@spacegeneration.org
www.spacegeneration.org
+43 1 718 11 18 30 Fax: +43 1 718 11 18 99